

**FACT SHEET FOR NPDES  
PERMIT NO. WA-002394-9**

**CITY OF WENATCHEE  
PUBLICLY-OWNED TREATMENT WORKS**

**SUMMARY**

The City of Wenatchee is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) Permit for its Publicly Owned Treatment Works (POTW). The POTW consists of approximately 106 miles of sewers, three lift stations and a wastewater treatment plant. Wastewater receives secondary-level treatment and is then discharged through a submerged outfall to the Columbia River.

During the early portion of the existing permit cycle, chronic and sometimes severe disruptions of the biological treatment process occurred at the City's treatment plant that resulted in numerous permit violations and several formal enforcement actions by the Department of Ecology. Subsequently, the City was sued by an environmental organization under the third-party lawsuit provisions of the Clean Water Act. Upsets of the treatment plant were thought to be caused by a combination of outdated treatment processes and disruptive industrial discharges.

In response to the Department's enforcement actions and the third-party lawsuit, the City has undertaken several corrective measures, including an overhaul of its pretreatment program and a major treatment plant upgrade. Improvements to the City's pretreatment program include adoption of a new Sewer Use Ordinance, hiring new staff and instituting an outreach program to more aggressively manage non-residential dischargers to its collection system. In addition, the City has assumed control of the collection system in a nearby industrial park, where the City will now be able to fully implement its pretreatment program. At this time, the treatment plant is undergoing a major upgrade, which will greatly improve reliability of its treatment processes. The proposed permit requires submittal of an updated pretreatment report, including an industrial user survey, during the upcoming permit cycle.

The proposed permit requires compliance with effluent limits based on the Federal secondary treatment standards, including limits for carbonaceous biochemical oxygen demand (CBOD) that have been substituted for the BOD limits in the existing permit. CBOD limits are established in this permit because the nitrogenous component of BOD causes interference in the analytical method that results in erroneous and falsely elevated BOD values. The City has presented documentation that the treatment plant is not technologically able to fully nitrify/denitrify and the cost to do so would be prohibitive. There is no State or Federal mandate to remove all nitrogen from the discharge, and the toxic component of nitrogen, ammonia, is already limited in the permit. Furthermore, Federal regulations have made explicit provision for such situations by allowing the use of CBOD limits, which are considered equivalent to the BOD technology-based limits. Therefore, the federally recommended limits for CBOD are incorporated into the proposed permit.

The proposed permit also requires implementation of the specified monitoring program. The monitoring program includes routine sampling of influent, effluent and biosolids, priority pollutant scans, and whole effluent toxicity testing of effluent during the third year of the permit cycle. The City is also required to characterize the receiving water, upstream of the outfall, for temperature and pH during the summer months. Receiving water data will be used in support of reasonable potential determinations at the next permit renewal.

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## **INTRODUCTION**

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Wenatchee
Facility Name and Address	City of Wenatchee POTW 201 North Worthen Street Wenatchee, WA 98807
Type of Treatment:	Class III: Activated Sludge Plant with Ultraviolet (UV) Disinfection
Discharge Location	Columbia River Latitude: 47° 25' 50" N Longitude: 120° 18' 32" W.
Waterbody ID Number	WA-CR-1040

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

The City's Publicly-Owned Treatment Works (POTW) consists of a treatment plant and an extensive sanitary collection system. The treatment plant is located on North Worthen Street, adjacent to Riverfront Park. The collection system provides service to residential, commercial and industrial customers within the City of Wenatchee, small areas of Chelan County, as well as the Port of Chelan/Olds Station industrial park. The Port's industrial park is located north of the City, on property owned by the Public Utility District No. 1 of Chelan County (PUD). Until recently, the PUD owned and operated its collection system, which is connected to the City's system at the Olds Station lift station; however, the City and the PUD have reached agreement for the City to assume ownership of the PUD collection system.

### History

The treatment plant was originally constructed in 1958 as a primary treatment facility. In 1975, secondary treatment was added that included aeration basins, secondary clarification and return activated sludge pumping. A diffuser was also installed at that time for dispersing the effluent into a wide area of the Columbia River. The capacity of the plant was later increased in 1984 by constructing more activated sludge aeration basin capacity.

In 1992-1993, other POTW upgrades were completed which allowed for an increase in the overall design capacity of the facility. The upgrades included a headworks, a second primary clarifier, heat exchangers for the anaerobic digesters, and a waste-gas burning boiler for heating the digesters as well as some new buildings.

### **Collection System Status**

The present sanitary collection system is composed of over 106 miles of concrete, PVC, clay and ductile iron pipe ranging in diameter from 6 inches to 42 inches. The system presently serves approximately 28,470 persons. The collection system serves the City, a small portion of Chelan County, and a small industrial area that was previously under control of the PUD, which discharges approximately 0.4 mgd of wastewater.

The five Infiltration & Inflow (I&I) Evaluations conducted by the City since 1997 have shown decreasing levels of I&I. The City's investigations have found the primary source of infiltration to be leaking irrigation system pipes and, to a smaller extent, leaking potable water supply pipes. Ground water was ruled out as a source of infiltration because the water table is generally more than 16 feet below the ground. The primary sources of inflow, defined as storm water introduced into the sanitary collection system, have been found to consist of poorly sealed manhole covers, cross connections between storm sewers and sanitary sewers, and a variety of illegally connected building drains.

The City has an active program of video inspections and dye testing to check the integrity of its sanitary and storm sewer systems. In addition, any leaking potable water supply and irrigation pipes found during street rehabilitation projects are replaced with PVC pipe. The City has also removed irrigation system discharges to the sanitary collection system. The General Sewer Plan that the City is required to submit to the Department in January 2007 should also provide some useful insights concerning the condition of the existing collection systems and future needs.

### **Treatment Processes**

At this time (February 2005), the City's treatment plant is undergoing an extensive upgrade. The upgrade was a key element of a Consent Decree signed between the City and two environmental organizations that sued the City for violations of its NPDES Permit. In addition, the engineering assessment that the Department initially required to address permit violations and concerns about treatment capacities eventually became an amended Facility Plan that identified the need for an upgrade. The upgrade is scheduled to be completed in July 2006. The following paragraphs describe the existing treatment plant and then the planned upgraded facility.

### **Existing Treatment Plant**

The wastewater treatment processes utilized by the City consist of a headworks with a 6-inch spaced manually-cleaned barscreen, a 1/2-inch spaced mechanically-cleaned barscreen, grit removal via Pista Grit Traps, and pre-aeration; primary clarification; activated sludge; secondary clarification; a DAFT unit; anaerobic digestion; gravity belt thickener; belt press thickener; sludge drying beds; chlorine disinfection; an outfall and process control buildings.

## **Upgraded Treatment Plant**

The upgraded plant will retain most of the existing treatment processes, although some will be refurbished to improve reliability, and an ultraviolet (UV) disinfection system will replace the chlorination system. Upgraded treatment processes and equipment will include replacement of the original influent gates, replacement of the influent pump drives and motors, extensive modification of the aeration basins, replacement of the secondary clarifier mechanisms, and installation of the UV disinfection system. A new programmable logic controller system with a personal computer-based Supervisory Control and Data Acquisition (SCADA) system will be installed to better control the liquid treatment processes. (The activated sludge management received a SCADA upgrade in 1992.) In addition, the return activated sludge pumps will be replaced.

One of the primary shortcomings of the existing plant is the lack of operational flexibility to incrementally vary control of the treatment processes. This upgrade will give operators the ability to incrementally change process controls, with the addition of such improvements as variable speed drive pump controls and the SCADA system.

While many elements of the upgrade are fairly straightforward, involving removal of old equipment and replacement with a similar but newer version, modification and operation of the aeration basins warrants more explanation because it is the primary biological treatment process in this facility. The existing aeration basins were designed to be operated in a complete mix mode only, which limited the operators' process control options. The treatment plant has two aerations basins. Each basin will be partitioned with the installation of baffles into four aeration zones. The first zone of each basin will retain the existing coarse-bubble diffusers and submersible mixers will be installed. Fine-bubble diffusers will be installed in the remaining zones. Flexibility will be improved to allow the basins to operate in the plug flow, plug flow with anoxic zone, or step-feed modes.

During plug flow operation, biological treatment occurs incrementally, as wastewater is treated in each succeeding aeration zone. Treated wastewater from the first zone is moved to the second zone, then the third, and finally the fourth. Removal of ammonia is expected to be excellent in this mode.

Plug flow with anoxic zone operates similarly to plug flow, except the first zone provides anoxic treatment of ammonia. Plug flow with anoxic zone provides effective treatment except during the coldest portions of the year. The anoxic zone facilitates the nitrification process, control of filamentous bacteria, and recovery of alkalinity. The anoxic zone removes nitrogen from the wastewater by conversion of nitrate to nitrogen gas. The anoxic zone will be equipped with coarse-bubble diffusers to provide added treatment capacity during cold weather operations.

The step-feed mode of operation is intended for use during periods of cold weather. In this mode the coarse-bubble diffusers in the first aeration basin zone will be utilized. To compensate for



the reduced treatment ability of the bacteria during cold weather, step-feed operation is designed to increase the average concentration of mixed liquor suspended solids in the aeration basins, while keeping solids to the secondary clarifiers at a minimum. In addition to the wastewater received from the preceding zone, each zone also receives some wastewater directly from the primary clarifiers. Although effluent ammonia concentrations are expected to increase slightly in this mode, due to cold-weather inhibition of nitrifying bacteria, overall effluent quality is anticipated to be well within permit limits.

As part of the settlement agreement with the environmental groups, the City agreed to replace its chlorine disinfection system with a ultraviolet (UV) system. After evaluating several designs, the City decided on a low-pressure/high-intensity system.

During high-intensity precipitation events, flows to the treatment plant can exceed 15 million gallons per day (MGD). The existing maximum daily hydraulic design loading is 10.6 MGD and the revised daily maximum will be 7.1 MGD. During the period from 1998 through 2002, the City experienced five stormwater events that resulted in flows to the treatment plant exceeding 10 MGD. The source of this inflow is believed to be roof drains in downtown Wenatchee and the City has found it very difficult to remove this source. In response to this problem, the City purchased an unused industrial wastewater treatment facility next to the treatment plant that will serve as an equalization basin. The existing earthen basin will be refurbished and a 60-mil Hypalon liner installed. In the event influent flows exceed 11 MGD, flows in excess of this volume will be pumped to the equalization basin.

### **Discharge Outfall**

Secondary treated and disinfected effluent is discharged to the Columbia River at River Mile 466.6 via a 36-inch diameter outfall line that terminates in a 60-ft long diffuser, which has six 10-inch diameter ports along the top of its length. The diffuser is placed perpendicular to the river flow and is located approximately 200 feet off-shore, below 20 feet of water during critical (low-flow) river conditions. The river is approximately 1,200 feet wide in the vicinity of the outfall and has a 7Q10 flow of 51,557 cfs.

### **Residual Solids**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings) and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

Primary and waste-activated solids are anaerobically digested to meet Class B pathogen requirements, as defined by the Code of Federal Regulations (CFR), Title 40, Part 503. The Class B biosolids are dewatered using a belt-filter press and hauled to drying beds located off-site, near Malaga, about 10 miles south of the City of Wenatchee. Biosolids are air-dried to meet

Class A pathogen requirements. The resulting biosolids are distributed to the public in bulk and small quantities.

### **Pretreatment**

The existing permit required the City to submit a Pretreatment Report, which was received by the Department in January 2004. The requirement for the report was motivated by the suspicion that many of the treatment plant upsets were caused by disruptive discharges from commercial and industrial users. In the report the City described measures it has taken to develop and implement a local pretreatment program to manage discharges from its commercial and industrial users.

The main elements of the City's expanded pretreatment program are: a revised Sewer Use Ordinance, an educational outreach program to commercial and industrial dischargers, hiring of new staff, and an enhanced sampling program to determine the source of non-compliant discharges. The revised Sewer Use Ordinance was adopted by the City Council in August 2003 and forms the foundation of the pretreatment program. It establishes local limits, specifies prohibited discharges and establishes a classification system for all discharges to the collection system. Dischargers are limited as to the concentrations of BOD and TSS they can discharge, depending on their classification. Grease traps, oil/water separators or grit traps are required for a wide variety of businesses, depending on the characteristics of their discharges. In the case of a recalcitrant discharger, the ordinance gives the City a variety of enforcement options.

The City's educational outreach program to prevent disruptive discharges has addressed photo and x-ray processors, fresh fruit packers, dischargers of fats, oil and grease, and non-contact cooling water. Businesses that discharge non-contact cooling water are limited to using chlorine as a biocide and sulfuric acid as a de-scalant.

The City hired a new staff person in July 2003 to assist the Environmental Coordinator with the pretreatment program. In addition to conducting sampling and inspections of businesses, pretreatment staff track compliance on computer software and perform educational outreach activities. Concerning the enhanced sampling program, the City is utilizing a laboratory screening method for discharges that may inhibit nitrification in activated sludge that was developed by the Swedish Environmental Protection Agency. Inhibition of the nitrification/denitrification process has been a major concern in the disruption of treatment processes.

### **PERMIT STATUS**

The previous permit for this facility was issued on January 27, 2000. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Total Residual Chlorine and Total Ammonia.

An application for permit renewal was received by the Department on August 20, 2004 and accepted by the Department on August 24, 2004.

## **SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT**

A compliance inspection without sampling was conducted on June 10, 2004.

From January 1999 through December 2000, the City experienced sometimes severe problems complying with the permit limits. As a result of these compliance problems, the Department issued two Notices of Violation (NOVs) to the City detailing a series of effluent limit violations. In addition, on November 23, 2001, the City was sued by two environmental organizations under the citizen suit provisions of the Clean Water Act for violations of the permit.

NOV No. DE 00WQCR-1188 was issued May 30, 2000. The NOV detailed 26 exceedances of BOD and TSS effluent limits that occurred from January 1999 through February 2000. The violations cited were predominantly exceedances of the BOD and TSS monthly and weekly average limits.

The City's response to the NOV was received by the Department on July 10, 2000. In its response the City stated that treatment plant upsets were caused primarily by high strength and slug discharges from industries in the PUD area. The facility suspected of causing many of the upsets, a large fruit processor, went out of business in 2002. In response to the Department's concerns that the treatment plant was being overloaded, the City proposed hiring an engineering consultant to assess the treatment system.

During the Summer of 2000, the Department and the City engaged in negotiations that eventually culminated in a Consent Order. However, these talks were delayed while the City solicited for the services of an engineering firm to conduct a comprehensive assessment of the POTW. This was the situation when the Department issued a second NOV.

NOV No. DE 01WQCR-2014 was issued on February 12, 2001. This NOV described 23 exceedances of effluent limits that occurred from March through December 2000. In addition to exceedances of BOD and TSS monthly and weekly effluent limits, the NOV cited three violations of the Fecal Coliform Bacteria limits. The majority of the violations occurred in December, when the treatment plant was upset for nearly the entire month.

Initial conversations with the City's staff suggested the cause of the upset to be a slug discharge of high strength wastewater from the fruit processor, which was suspected of having caused previous upsets. For this reason, the NOV asked the City what steps it was taking to manage industrial discharges, especially from the PUD area, where the fruit processor was located. In its response to the NOV, the City described changes to process control procedures implemented at the treatment plant and explained progress made toward the engineering assessment. However, at that time, the City was reluctant to actively manage its industrial dischargers, especially those

in the PUD area. The City's perspective was that it had a contract with the PUD for capacity at the treatment plant, and that the responsibility for managing these facilities was with the PUD and the Department. Since issuance of the second NOV the City has made significant progress developing and implementing a pretreatment program, including adopting an updated Sewer Use Ordinance and routinely working with the industrial and commercial dischargers to its collection system. These efforts are more fully described in the Pretreatment section of this fact sheet.

As a result of the two NOVs, Consent Order No. DE 02WQCR-4550 was signed by both the Department and the City in July 2002. The Order's requirements and their status are summarized as follows:

**Table 1: Status of Permit Submittals**

Requirement	Status
1. Conduct engineering analysis of the POTW and submit draft amended Facility Plan by October 15, 2002.	Completed
2. Submit final amended Facility Plan by January 15, 2003.	Completed
3. Pretreatment measures: a) develop and implement procedures for detecting and tracking discharges that may upset the treatment plant, and, b) develop and implement procedures for inspecting facilities to prevent such discharges.	Completed
4. Include in the updated Sewer Use Ordinance (required by the existing permit) numerical limits that are adequate to protect the treatment plant.	Completed
5. Submit a new Facilities Plan by January 15, 2008.	Pending
6. Immediate notification of noncompliance of any requirements of the Consent Order.	Ongoing
7. Develop General Sewer Plan and submit by January 15, 2007.	Pending

The details of requirements 1, 2, 5 and 7 are discussed in the Design Criteria section of this fact sheet. Requirements 3 and 4 are discussed in the Pretreatment section of this fact sheet. The requirement to immediately notify the Department of noncompliance with the Order, up to this time, continues to be satisfied.

Consent Decree No. CY-01-3099-EFS: In November 2001, after issuance of the second NOV, two environmental organizations sued the City for violations of its NPDES Permit. The case was settled before trial with a consent decree that was registered in Federal District Court on September 30, 2002. As part of the settlement, the City was required to upgrade its treatment plant. The main elements of the upgrade were described in the Treatment Processes section of this fact sheet.

## WASTEWATER CHARACTERIZATION

### Influent

Loadings to the POTW, from January 2002 through December 2003, were reported in DMRs submitted to the Department and are compared with the applicable design loadings in the table below. Design loadings were taken from Table 3-1 of the 2003 Facility Plan.

**Table 2: 2002-2003 Influent Characterization**

Parameter	2-year Characterization		Design Loadings	
	2-year Average	Highest Reported Monthly Average	Existing Maximum Monthly Average	Post-Upgrade Maximum Monthly Average
BOD <sub>5</sub> , in lbs/day	7579	9016	10,300	13,006
TSS, in lbs/day	7412	9076	10,100	13,111

### Effluent

#### Conventional and Non-conventional Parameters

This fact sheet does not contain an effluent characterization of the treatment plant's performance during the existing permit cycle for conventional and non-conventional parameters. The characterization was not done because the City is currently implementing an extensive upgrade and a characterization of the treatment plant's discharge is unlikely to adequately reflect the upgraded facility's expected performance. The upgrade is comprehensive, including modifications to the physical and biological treatment processes, the activated sludge process, the facility's process control system, and replacement of the disinfection system. Post-upgrade discharges are anticipated to be dramatically improved from the existing effluent quality. For instance, the discharge will not contain chlorine and is expected to contain lower concentrations of ammonia. In addition, this permit will regulate oxygen demand as 5-day carbonaceous BOD (CBOD<sub>5</sub>), rather than total BOD<sub>5</sub>. That the treatment plant was not able to consistently comply with the effluent limits in the existing permit to the extent that the upgrade was required has already been adequately documented and requires no further explanation. Details of the treatment plant's past performance can be found in either DMRs or the 2003 Facility Plan on file at the Department's Central Regional Office.

#### Priority Pollutants

Due to its status as a major municipal discharger, the existing permit required the City to conduct testing of its influent, effluent and sludge for priority pollutants. Samples were taken in

September 2001 and September 2003. The results are summarized in the table below. Only those pollutants present at one of the sample points and above the analytical method detection limit are reported. The unit of measure for priority pollutant metals present in biosolids is different; therefore, metals data are presented separately.

**Table 3: Priority Pollutants Concentrations in Influent, Effluent and Biosolids**

Parameter	Influent (µg/L)		Effluent (µg/L)		Biosolids (µg/Kg)	
	2001	2003	2001	2003	2001	2003
gamma-BHC (Lindane)	ND	ND	ND	ND	69	ND
gamma-Chlordane	ND	ND	ND	ND	180	ND
4,4'-DDD	ND	ND	ND	ND	ND	34
4,4'-DDE	ND	ND	ND	ND	84	69
4,4'-DDT	ND	0.16	ND	ND	41	ND
Dieldrin	ND	ND	ND	ND	ND	35
Endrin	ND	ND	ND	ND	180	ND
Total Phenolics	35	12	ND	ND	22	25
Carbon Disulfide	ND	ND	ND	ND	12	ND
Chloroform	5.6	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	130	ND
Tetrachloroethene	ND	25	ND	ND	ND	ND
bis(2-ethylhexyl)-phthalate	35	12	ND	ND	22	25
Phenol	79	22	ND	ND	ND	ND

ND means non-detect

It should be noted that the presence of the above priority pollutants is typical of a large treatment plant with a diverse base of industrial and commercial dischargers, and residential customers. The presence of DDT and its metabolites, banned more than 30 years ago, is a testament to its pervasive and refractory characteristics. It is still found in many treatment plants located in agricultural areas.

## Metals

Results of influent and effluent sampling for metals are presented in the following table. Only data for metals that were present in at least one sample are reported.

**Table 4: Metals Concentrations in Influent, Effluent and Biosolids**

Parameter	Influent (µg/L)		Effluent (µg/L)		Biosolids (mg/Kg)	
	2001	2003	2001	2003	2001	2003
Arsenic	ND	ND	ND	ND	5	ND
Cadmium	ND	ND	ND	ND	3	1.5
Chromium	6	ND	ND	ND	68	35.7
Copper	72	58.6	17	24.6	752	578
Lead	8	2.8	ND	ND	178	78.9
Mercury	0.2	ND	ND	ND	3.4	2.18
Nickel	ND	ND	ND	ND	22	19.9
Selenium	ND	ND	ND	ND	5	5.7
Silver	14	ND	ND	ND	135	58.2
Zinc	187	117	65	76.1	1510	1020
Cyanide	ND	ND	ND	ND	6.5	4.1

## SEPA COMPLIANCE

Appendix H of the 2003 Facility Plan Amendment contains documentation addressing the environmental review processes required by State and Federal regulations.

## PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were

determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

## DESIGN CRITERIA

In accordance with WAC 173-220-150(1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for the existing and upgraded treatment facility are taken from Table 3-1 of the Final Facility Plan Amendment, dated January 2003, prepared by CH2MHILL, and are as follows:

**Table 5: Design Criteria for the Existing Wenatchee WWTP.**

Parameter	Design Quantity
Monthly average flow (max. month)	5.5 MGD
BOD <sub>5</sub> influent loading	10,300 lbs/day
TSS influent loading	10,060 lbs/day
Design population equivalent	34,375 persons

**Table 6: Design Criteria for the Upgraded Wenatchee WWTP.**

Parameter	Design Quantity
Monthly average flow (max. month)	5.5 MGD
BOD <sub>5</sub> influent loading	13,006 lbs/day
TSS influent loading	13,111 lbs/day
TKN influent loading	1,800 lbs/day

The design population equivalent has been dropped from the criteria for the upgraded plant because the City contains many commercial and industrial dischargers and assigning population equivalents to industrial facilities can be subjective and is not an effective measure of treatment capacity. The Department feels design loadings for nitrogen to the treatment plant provides a more objective and worthwhile measure of treatment capacity.



## TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

The following technology-based limits for pH, fecal coliform bacteria, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC are:

**Table 7: Technology-based Limits.**

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
Carbonaceous BOD <sub>5</sub> (CBOD <sub>5</sub> ) (concentration)	Average Monthly Limit is the most stringent of the following: - 25 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 40 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

### CBOD<sub>5</sub> Effluent Limits

The City has requested that the proposed permit substitute CBOD<sub>5</sub> effluent limits for the BOD<sub>5</sub> limits that appear in the existing permit. The City's position is that the partial nitrification required to comply with the ammonia effluent limits interferes with the laboratory analysis for BOD<sub>5</sub>, producing inaccurately high BOD<sub>5</sub> test results. During either complete nitrification or no nitrification, the BOD tests appear unaffected. These observations are in line with guidance contained in Section 3.6.1 of the Department's Permit Writers Manual.

As explained in the Permit Writers Manual, Ecology has determined that, unless there is an identified water quality impairment in the receiving water for nitrogen, a facility has no obligation to remove nitrogenous oxygen-demanding substances from its wastewater. The BOD limit is intended to address oxygen demand of the discharge, rather than the nutrient loading or toxicity characteristics. The nitrogen portion of BOD is more appropriately addressed by either a

total nitrogen limit, if the receiving water is nutrient-limited, or an ammonia limit, if toxicity is a concern. At this time, the Columbia River is not considered water quality-impaired for nutrients, and the Department has determined that the effluent limits for ammonia in the proposed permit will prevent toxicity to aquatic life.

Section 3.6.2 of the Permit Writers Manual details a process to determine the appropriate CBOD<sub>5</sub> limits. Task 3a recommends establishing a ratio between BOD<sub>5</sub> and CBOD<sub>5</sub> for months during which low or moderate nitrification occurs. However, the treatment plant experienced a low-grade upset condition for extended periods of time, so pinpointing the status of nitrification during past operations would take considerable effort. Furthermore, planned modifications to the aeration basins and the activated sludge system are expected to improve the facility's nitrification process. Therefore, this permit establishes the CBOD<sub>5</sub> concentration limits in Table 7, as recommended in the State and Federal regulations, without further analysis.

### **CBOD<sub>5</sub> Mass Loadings**

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (5.5 MGD) x Concentration limit (25 mg/L) x conversion factor (8.34) = 1,147 lbs/day.

The weekly average mass loadings were calculated as the maximum monthly design flow (5.5 MGD) x Concentration limit (40 mg/L) x conversion factor (8.34) = 1,835 lbs/day.

### **TSS Mass Loadings**

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (5.5 MGD) x Concentration limit (30 mg/L) x conversion factor (8.34) = 1,376 lbs/day.

The weekly average mass loadings are calculated as 1.5 x monthly loading = 2,064 lbs/day.

### **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### **Numerical Criteria for the Protection of Aquatic Life**

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### **Numerical Criteria for the Protection of Human Health**

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### **Narrative Criteria**

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### **Antidegradation**

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

### **Critical Conditions**

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

## **Mixing Zones**

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

## **Description of the Receiving Water**

The facility discharges to the Columbia River, which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include those of Tree Top, Inc. and The Chinnet Company, located approximately 3.5 miles upstream, and the City of East Wenatchee's POTW outfall, located approximately 1 mile downstream on the opposite bank. Significant nearby non-point sources of pollutants include storm water runoff from agricultural lands and urbanized areas. In addition, the Wenatchee River discharges into the Columbia River approximately 2 miles upstream of the Permittee's outfall.

Characteristic uses of the receiving water include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

The segment of the Columbia River to which the City discharges is on the Department's 303(d) list for exceedances of the State's surface water standards for the parameters of temperature and total dissolved gas. The Department and the EPA are conducting cooperative TMDL Studies for these two parameters. Preliminary findings of the assessments determined the primary causes of the impairments to be the large hydroelectric dams on the river; point source discharges, such as the City's, were found to be insignificant contributors to the impairments.

Special Condition S12.A of the existing permit required the City to develop and implement a sampling program to characterize metals in the Columbia River. The resulting data are used in this fact sheet to determine whether metals in the discharge are expected to cause exceedances of the water quality criteria. None of the results indicated exceedances of the applicable water quality criteria.

Copper and zinc were present in the City's discharge and required reasonable potential determinations. Reasonable potential determinations, in turn, require background (ambient) data. The existing permit required the City to characterize the river for metals upstream of the outfall, which the City successfully completed. During development of the proposed permit, other sources of ambient metals data were explored so that the City's efforts would not be repetitive of the efforts of other agencies.

The portion of the Columbia River that lies within the State of Washington is sampled for metals at several locations. The Department maintains long term monitoring sites at Northport (River Mile 735.1), near Vernita Bridge (R. M. 405) and Umatilla, Oregon (R. M. 290.5). The City's outfall is located at R. M. 466.6. Unfortunately, the sampling stations are too distant from Wenatchee for the sampling data to be useful.

Data collected by the City during the existing permit cycle is sufficient to conduct reasonable potential determinations for the proposed permit, so receiving water sampling for metals is not required during the upcoming permit cycle. The Department anticipates it will be able to establish an ambient monitoring station upstream of the City to sample for metals in the near future. Sampling in this location would fill a data gap for a long segment of the river, from Northport to Umatilla, and would aid in permit development for a cluster of municipal and industrial facilities that discharge to this segment of the river. The need for the City to conduct receiving water monitoring will be reevaluated at the next permit renewal.

### Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

**Table 5: Applicable Water Quality Criteria**

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

Water quality criteria were developed for the two priority pollutants detected in the City's discharge, copper and zinc, to support the reasonable potential determination for the discharge to

exceed the water quality standards. The numeric criteria, and their basis, are presented in the section of this fact sheet, Consideration of Surface Water Quality-based Limits for Numeric Criteria-Toxic Pollutants.

## CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC.

### Determination of Dilution Factors

In 1997, the City completed a *Mixing Zone Study* that estimated the applicable dilution factors for both the acute and chronic mixing zones at varying receiving water flows. The study was conducted by Gray & Osborne, Inc., using the CORMIX 2 (version 3.20) computer flow model.

The following parameters were used in the model to describe receiving water conditions:

**Table 6: Receiving Water Characteristics Used in Mixing Zone Study**

Characteristic	Value
Width of receiving water channel	366 m (1,200 ft)
Ambient flow rate	1,460 m <sup>3</sup> /s (51,557 cfs)
Average depth	7.62 m (25 ft)
Depth at 7Q10	6.71 m (22 ft)
Mannings <i>n</i>	0.030
Temperature	15.6°C (60°F)

The following diffuser and discharge parameters were used in the model:

**Table 7: Diffuser Characteristics Used in Mixing Zone Study**

Characteristic	Value
Diffuser type	Unidirectional perpendicular
Diffuser length	15.2 m (50 ft)
Diffuser endpoints	Start 30.5 m (100 ft)
(from right bank)	End 45.7 m (150 ft)
Number of ports	6
Spacing between ports	3.04 m (10 ft)
Port nozzle diameter	0.254 m (10 in)
Discharge port height	0.3 m (1 ft)
Discharge temperature	22.2°C (72°F)

The 1997 study assumed an effluent volume of 6 MGD. The reason for using this flow value, rather than the approved maximum monthly flow criterion of 5.5 MGD is unknown, but it adds a conservative influence into the calculations by decreasing the dilution factors.

The acute and chronic dilution factors calculated by the study at the 7Q10 low flow (51,557 cfs) of the Columbia River were as follows:

**Table 8: Applicable Dilution Factors**

Mixing Zone Type	Acute	Chronic
Aquatic Life	139	244

The basis of the 7Q10 flow used in the mixing zone study was not well documented, but appears low. A summary of river flows downloaded from the U. S. Geological Survey National Stream Water Quality Accounting Network (NASQAN) webpage, for water years 1996-2000, shows a minimum recorded flow of 44,900 cfs and a fifth percentile flow of 72,900 cfs. These flows were measured at the Vernita Bridge, near Priest Rapids Dam. The apparently low 7Q10 value may be explained by a previous comprehensive river flow regime used by the Federal agencies that manage the Columbia River. Flow management is occasionally revised in response to several factors, such as the needs of irrigators, power generators or endangered species.

Although the organic design loadings of the treatment plant were revised in the approved 2003 Facility Plan, the hydraulic design loadings remain unchanged. Therefore, the existing dilution factors are retained from the existing permit. However, in light of the high effluent flow value and the apparent low 7Q10 flow on which the dilution factors are based, the City may want to consider conducting a revised mixing study in the future to update the dilution factors, perhaps as part of the facility plan to be developed in 2008.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

CBOD<sub>5</sub>--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Furthermore, the current upgrade is expected to significantly improve treatment of carbonaceous BOD in the wastewater. Oxygen demand of nitrogenous BOD is regulated by the

ammonia limits in the permit. A more detailed discussion of the BOD/CBOD issue is contained in the Technology-based Effluent Limitations section of this fact sheet. The Department anticipates that technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature and pH--The impact of pH and temperature were not modeled because the treatment plant is undergoing a significant upgrade. However, due to the large amount of dilution available, there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH was placed in the permit and temperature was not limited.

Fecal coliform--The impact of fecal coliform bacteria were not modeled because the treatment plant is undergoing a significant upgrade. However, due to the large amount of dilution available, there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, copper and zinc. Reasonable potential analyses (See Appendix C) were conducted for ammonia, copper and zinc to determine whether or not effluent limitations would be required in this permit. A reasonable potential determination for chlorine was not conducted because the City's new UV disinfection system will be operational by the time the proposed permit is effective.

## **Ammonia**

The determination of the reasonable potential for ammonia, copper and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 at the critical condition. The critical condition for ammonia occurs during the warm weather months of July, August and September, when toxicity increases with temperature. The parameters used in the critical condition modeling are as follows: acute dilution factor 139, chronic dilution factor 244, receiving water temperature 15.6°C and a receiving water pH of 8.1. Receiving water pH and temperature values from the previous permit were used to determine the ammonia criteria for this permit. The City will be required to conduct receiving water monitoring to characterize critical season temperature and pH during the upcoming permit cycle.



Assuming a receiving water temperature of 15.6°C and pH of 8.1, the resulting ammonia criteria were as follows:

**Table 9: Ammonia Water Quality Criteria**

<b>Acute Criteria</b>	<b>Chronic Criteria</b>
4.5 mg/L	0.99 mg/L

Incorporating the applicable dilution factors, the calculated water quality-based effluent limits are presented in Table 10. The Department's standard spreadsheets for calculating ammonia criteria (AMMONIA.XLS) and water quality-based limits (LIMITS.XLS) are contained in Appendix C of this fact sheet. The ammonia effluent limits in the previous permit are included in the table for comparison.

**Table 10: Calculated and Existing Effluent Limits for Ammonia**

	<b>Average Monthly</b>	<b>Maximum Daily</b>
Calculated Limits	198 mg/L	397 mg/L
Existing Limits	25 mg/L	47 mg/L

The documentation explaining the basis of the existing limits are not available; however, they are assumed to be performance-based limits established in the discharge permit issued in approximately 1991. In any case, the existing limits are more stringent than the calculated water quality based limits; therefore, the existing limits are retained in the proposed permit.

A determination for reasonable potential of ammonia in the discharge to exceed the water quality criteria at the edge of the acute and chronic mixing zones was conducted. The Department's standard spreadsheet used for this assessment, REASPOT.XLS, is contained in Appendix C. The maximum measured effluent concentration of 34 mg/L was reported in the permit application. Although no reasonable potential and no need for a limit is indicated in the spreadsheet, this permit retains the existing limits as an interim measure, until the performance of the upgraded treatment plant to treat ammonia can be quantified. Although treatment of ammonia is expected to be enhanced in the upgraded facility, removal of the ammonia limits at this time would be premature without data to provide confirmation and may be construed as backsliding. Furthermore, sampling of the river for temperature and pH during the critical season, as required in the proposed permit, will provide data to calculate updated ammonia criteria. At the next permit renewal, after the efficacy of the upgraded treatment plant can be documented and updated ammonia criteria calculated, the necessity for ammonia effluent limits will be reevaluated.

## Metals

Surface water quality criteria were developed for the two dissolved metals found to be present in the City's effluent, copper and zinc. The criteria were developed as part of the reasonable potential determination (see Appendix C.) The criteria for both metals are hardness-dependent. The hardness value used in developing the criteria was 62 mg/L, as CaCO<sub>3</sub>, the average reported in the City's receiving water study. The calculated copper and zinc criteria are as follows:

**Table 11: Metals Water Quality Criteria**

Parameter	Acute Criteria	Chronic Criteria
Copper	10.85	7.54
Zinc	76.33	69.70

Valid ambient background data were available for dissolved copper and zinc. Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards. Therefore, the proposed permit does not contain effluent limits for either copper or zinc.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

## Whole Effluent Toxicity

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent and, therefore, this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sub lethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC<sub>50</sub>, EC<sub>50</sub>, IC<sub>25</sub>, etc. All accredited labs have been provided the most

recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The existing permit required only one sample event, with one species for acute and chronic whole effluent toxicity, which occurred in September 2003. The test results showed no toxicity, but the Department has determined that more testing is needed during the upcoming permit cycle. The most rigorous and complete WET testing program was conducted by the City during the 1990's. The tests revealed acute toxicity in 1998 and 1993. No evidence of chronic toxicity have been found in the City's discharge. The Department's WET Coordinator determined that an acute WET limit was necessary. However, an acute WET limit was not put into the existing permit because, due to the chronic and sometimes severe treatment plant upsets occurring at the time, it was obvious the treatment plant needed an upgrade, so only minimal WET testing and no WET limit were put into the permit.

The treatment plant upgrade occurring at this time is scheduled for completion in April 2006. The WET characterization in the proposed permit is required to begin in July 2007, to allow for any construction delays that may occur and to allow the City additional time to implement its pretreatment program. Effluent characterization will occur from July 2007 to July 2008. The permit requires the City to submit results for each test to the Department within 60 days of each sample date and acute and chronic toxicity summary reports after the characterization is completed.

### **Human Health**

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on the results of the two priority pollutant scans submitted to the Department. (See Tables 3 and 4.) The metals copper and zinc do not have human health criteria. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

### **Sediment Quality**

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

## COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED 2000

**Table 12: Comparison of Existing and Proposed Effluent Limits**

Parameter	Existing Permit		Proposed Permit	
	Average Monthly	Average Weekly	Average Monthly	Average Weekly
BOD <sub>5</sub> , in mg/L; lbs/day	30; 1,376	45; 2,064	NA	NA
CBOD <sub>5</sub> , in mg/L; lbs/day	NA	NA	25; 1,147	40; 1,835
TSS, in mg/L; lbs/day	30; 1,376	45; 2,064	30; 1,376	45; 2,064
Fecal Coliform Bacteria, in #colonies/100 MI	200/100 mL	400/100 mL	200/100 mL	400/100 mL
Parameter	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Ammonia, in mg/L; lbs/day	25; 1,147	47; 2,156	25; 1,147	47; 2,156
TRC, in mg/L; lbs/day	1.4; 64.2	2.1; 96.3	NA	NA
pH	Between 6.0 and 9.0.		Between 6.0 and 9.0.	

The proposed permit contains several revisions to the effluent limits in the previous permit. First, at the City request and in accordance with Federal regulations, CBOD<sub>5</sub> limits have been substituted for BOD<sub>5</sub> limits. The CBOD<sub>5</sub> limits were incorporated into the permit because the nitrogen contained in treated wastewater distorts the BOD<sub>5</sub> analytical results. The CBOD<sub>5</sub> concentration limits are those recommended in the applicable Federal statute. Consequently, the BOD<sub>5</sub> limits have been dropped from the proposed permit.

The proposed permit does not contain TRC limits because the chlorine disinfection system is being replaced by a UV system.

## MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The maximum monthly design flow of City's treatment plant is 5.5 MGD, although actual flows

rarely exceed 4 MGD. The Department's *Permit Writer's Manual* (July 1994) recommends sampling frequencies of 5/week for BOD and TSS, and 7/week for fecal coliform bacteria, for an activated sludge plant with a design flow of greater than 5 MGD. However, the sampling frequencies in the existing and proposed permits are 3/week for BOD/CBOD, TSS and fecal coliform bacteria, as recommended for a facility with a design flow less than 5 MGD. In the best professional judgment of the Department the existing monitoring frequencies are adequate to characterize effluent quality.

The City is required to have influent, final effluent, and sludge sampled for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass through the plant to the sludge or the receiving water.

During the existing permit cycle, the City conducted a study to characterize the Columbia River for metals, as required by the permit. City staff collected nine samples upstream of the outfall. The results of the study are presented in Appendix C. Ambient sampling for metals is not required during the upcoming permit cycle, because the Department anticipates a project sampling station will be established upstream of the outfall in the next couple years, and sampling by the City would be redundant. The need for the City to conduct receiving water monitoring will be reevaluated at the next permit renewal.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current State and local solid waste management program and also by EPA under 40 CFR 503.

## **LAB ACCREDITATION**

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for the following wastewater parameters: alkalinity, ammonia, BOD/CBOD, TRC, DO, TSS, hardness, pH and fecal coliform bacteria.

## **OTHER PERMIT CONDITIONS**

### **REPORTING AND RECORDKEEPING**

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

## **PREVENTION OF FACILITY OVERLOADING**

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

The proposed permit does not have explicit requirements for either an I&I Evaluation or a Wasteload Assessment because the City is required to submit more comprehensive assessments as part of the Consent Order with the Department. The City is required to submit a new General Sewer Plan in January 2007 and a new Facility Plan in January 2008. Therefore, the need for the submittal of routine I&I Evaluations or Wasteload Assessments will be reevaluated at the next permit renewal.

## **OPERATION AND MAINTENANCE (O&M)**

The proposed permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The proposed permit requires the City to submit a new O&M Manual. The new manual is required to address the process modifications and operational flexibilities built into the upgraded treatment plant.

## **RESIDUAL SOLIDS HANDLING**

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Chelan County Health District.

Requirements for monitoring biosolids and recordkeeping are included in this permit. This information will be used by Ecology to develop or update local limits and may also be required under 40 CFR 503.

## **PRETREATMENT**

### **Federal and State Pretreatment Program Requirements**

Under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e., act as the Approval Authority for oversight of delegated POTWs). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)) (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

### **Wastewater Permit Required**

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

### **Requirements for Routine Identification and Reporting of Industrial Users**

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of its responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

### **Requirements for Performing an Industrial User Survey**

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of State waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Conducting an Industrial User Survey".

### **Duty to Enforce Discharge Prohibitions**

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.



The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

### **Support by the Department for Developing Partial Pretreatment Program by POTW**

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

### **Requirement for Pretreatment Report**

In January 2004, the City submitted a pretreatment report required by the existing permit. The report described the steps taken by the City to expand its locally-developed pretreatment program to better protect the POTW from disruptive discharges. The main elements of the City's existing program are discussed earlier in this fact sheet.

Industrial users are dischargers whose process wastewater does not have the same, or essentially the same, characteristics (composition and strength) as domestic sewage. Industrial users are also referred to as "indirect dischargers" because the ultimate discharge to the receiving water is through another facility (a POTW). The categories of industrial users include: SIUs, potential significant industrial users (PSIUs), and insignificant industrial users (IIUs).

- A. SIUs are industrial users which meet, at least, one of the following criteria:
  - (1) Discharge wastewater from a process regulated under the Categorical Pretreatment Standards contained in 40 CFR 403.6 and/or 40 CFR chapter I, subchapter N;
  - (2) Discharge wastewater which meets, at least, one of the following criteria:
    - a. Daily average process wastewater flows exceeds 25,000 gallons per day (excluding sanitary, non-contact cooling water and boiler blowdown wastewater); or
    - b. Maximum daily discharge volume which exceeds 5% of the average dry weather hydraulic or organic capacity of the POTW; or
  - (3) Is deemed by the City or the Department to have a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)), including the City's SUO and local limits.

- B. PSiUs are industrial users which meet, at least, one of the following criteria:
  - (1) Discharge wastewater which meets, at least, one of the following criteria:
    - a. Daily average process wastewater flows exceeds 5,000 gallons per day but not more than 25,000 gallons per day (excluding sanitary, non-contact cooling water and boiler blowdown wastewater); or
    - b. Maximum daily discharge volume which exceeds 1% of the average dry weather hydraulic or organic capacity of the POTW; or
  - (2) Is otherwise deemed by the City or the Department to be so categorized.
- C. IIUs are industrial users which fit neither the SIU or PSiU definitions.

## **GENERAL CONDITIONS**

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## **PERMIT ISSUANCE PROCEDURES**

### **PERMIT MODIFICATIONS**

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

### **RECOMMENDATION FOR PERMIT ISSUANCE**

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

## REFERENCES FOR TEXT AND APPENDICES

### CH2MHILL

2003. City of Wenatchee Wastewater Treatment Plant Amendment.

### Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

### Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

### Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

### Washington State Department of Ecology.

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information

(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

### Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

### Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

## **APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 15, 2004 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on March 3, 2005 in the Wenatchee World to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Central Regional Office  
15 West Yakima Avenue, Suite 200  
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

## APPENDIX B -- GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD<sub>5</sub>** -- The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD<sub>5</sub> is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over a short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.



**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C -- TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

### Calculation of Ammonia Criteria

Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

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#### INPUT

1. Ambient Temperature (deg C; 0<T<30)	15.6
2. Ambient pH (6.5<pH<9.0)	8.10
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

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#### OUTPUT

1. Intermediate Calculations:	
Acute FT	1.36
Chronic FT	1.41
FPH	1.00
RATIO	14
pKa	9.54
Fraction Of Total Ammonia Present As Un-ionized	3.4818%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	191.9
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	42.0
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	5.5
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.2
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	4.5
Chronic Ammonia Criterion as N	0.99

Calculation of Water Quality-Based Ammonia Limits

	Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.						Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit calculation			
	Acute Dil'n Factor	Chronic Dil'n Factor	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Prob'y Basis	Limiting LTA	Coeff. Var. (CV)	AML Prob'y Basis	MDL Prob'y Basis	# of Samples per Month
PARAMETER			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	decimal	decimal	ug/L	decimal	decimal	decimal	n
Ammonia	139	244	4500	990	197789.5	396803.1	625500	241560.00	200837.6	127406.8	0.60	0.99	127406.8	0.60	0.95	0.99	4.00
											0.60	0.99		0.60	0.95	0.99	4.00
											0.60	0.99		0.60	0.95	0.99	4.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98. Written by G. Shervey.

Wenatchee POTW Determination of Reasonable Potential

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in <u>Technical Support Document for Water Quality-based Toxics Control</u> , U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)									CALCULATIONS								
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n			
Ammonia				4500	990	46.43	26.45	NO	0.95	0.688	3400.00	0.60	0.55	8	1.90	139	244
						#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55		#DIV/0!		
						#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55		#DIV/0!		
Copper	0.996	0.996	0.72	10.85	7.54	1.38	1.10	NO	0.95	0.224	24.60	0.60	0.55	2	3.79	139	244
Zinc	0.996	0.996	1.84	76.33	69.70	3.90	3.01	NO	0.95	0.224	76.10	0.60	0.55	2	3.79	139	244
						#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55		#DIV/0!		
						#DIV/0!	#DIV/0!	#DIV/0!	0.95	#DIV/0!		0.60	0.55		#DIV/0!		

**APPENDIX D -- RESPONSE TO COMMENTS**

No comments were received by the Department of Ecology.